ON THE RADICAL CURE OF HYDROCELE BY ANTISEPTIC INCISION.[1]

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AT the present moment there may be said to be three methods prominently before the profession for the radical cure of hydrocele—the time-honored injection of iodine, the antiseptic incision and suture of the tunica vaginalis to the scrotal skin (with drainage), proposed by Volkmann, and the more recent method of the injection of carbolic acid, suggested by Levis, of Philadelphia. An important modification of Volkmann's method has been adopted by Bergmann, of Berlin. It consists in the extirpation of all the tunica vaginalis save that covering the testicle. I have had some experience with the antiseptic incision, which I wish to present to the society, though the general results of that method may be familiar to all.

But I wish to mention these results because but one or two American surgeons have reported their experience in detail, and because I know that members of the society have had a large experience with other methods. It is, hence, rather as a suggestion for a discussion that I offer these few remarks.

I have operated on fourteen patients in all. One case may be thrown out of consideration, since the cure of a large reducible hernia was attempted at the same time, and the patient died from peritonitis. Of the thirteen patients, all made satisfactory recoveries but one. This was a laboring man, forty-two years of age, somewhat debilitated from exposure and lack

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of food, but presenting no signs of organic disease of the internal organs, who had had double hydrocele for six months. Both sides were operated on at once; the wound was irrigated moderately with 1 to 5,000 solution of bichloride of mercury, and a dressing of bichloride gauze was applied. In forty-eight hours diarrhœa occurred. This was followed by vomiting, abdominal pain, and tympanites, and on the fourth day he died. At the autopsy there were found only the evidences of violent gastro-enteritis, the rectum containing several patches of gangrenous mucous membrane.

Of the twelve successful cases, ten were hydroceles of the tunica vaginalis, and two were hydroceles of the cord. The two latter had existed each for three or four years. The duration of the former was in six cases "about one year," in two cases between one and two years, in two others three years and over. As regards previous treatment, two had been injected with carbolic acid (one of them on two occasions), one with tincture of iodine, and the rest had been tapped or received no treatment. At the time of operation but one sac was observed to be decidedly thickened. This contained one or two calcareous patches, which were cut out. One hydrocele of the cord, as large as a horse-chestnut, was found to be made up of five or six cysts. This case carbolic acid had failed twice to cure. The other hydrocele of the cord was in reality a compound cyst of the head of the epididymis. A number of cysts of the size of a split pea were clustered about the epididymis, and contained within a larger cyst which reached up on the cord for an inch and a half.

In ten cases Volkmann's operation was done; in two (the cysts of the cord and epididymis) the entire parietal layer of the tunica vaginalis was excised. Bichloride of mercury of the strength of 1 to 5,000 was used in moderation to irrigate the wounds, and extreme care taken to tie all bleeding points. The incisions were long enough to reach from the top of the sac to the bottom of the scrotum. The tunica vaginalis was united by a continuous catgut suture to the skin, and two or three deeper sutures were applied to hold the two halves of the sac in contact. A further effort was made in this direction by the application of the dressing in such a way as to *hold* the

serous surfaces together. Bone tubes were used in three cases, rubber drains in nine. And here I may say that the latter were shown to be preferable. The bone tubes softened rapidly, but were not absorbed at all, and did not adapt themselves to the sinuosities of the wound. The dressing was uniformly of peat-bags (with bichloride) and bichloride gauze, with occasionally a strip of iodoform gauze over the line of the suture, and an outer layer of absorbent cotton. There was no instance of excoriation or marked erythema of the skin. The penis protruded through the middle of the dressing, which was applied snugly with crinoline bandages. One or two patients had to be catheterized for twenty-four or forty-eight hours; but this was the only discomfort experienced. The career of the wounds was in all cases aseptic, and without fever. A temperature of 100.6° on the evening of the second to third day, without any acceleration of the pulse, was the greatest constitutional disturbance. With little variation, the first dressing remained in place till the seventh day. On its removal the tubes were withdrawn, and a lighter dressing of iodoform or boric-acid ointment and plain absorbent cotton was applied, supported by a suspensory bandage. This was changed as often as it became soiled. The patients were allowed to move about a day or two later, but were not, with one or two exceptions, discharged till the sinuses were healed. As a rule, primary union was found on removing the first dressing. In six cases this was *complete* except where the drainage-tube emerged; in five, besides the "drain sinus," there was a strip of granulations along a portion of the line of suture, forming a quite superficial ulcer, which scabbed over rapidly. In one case primary union was secured, but an accumulation of pus (without fever) made it necessary to break down the adhesion, and the abscess required two months to heal. The sinuses left after removal of the drain healed without special attention. There was no instance of orchitis, or epididymitis, or inguinal adenitis, and the induration and thickening along the cord, which had been noted by others, disappeared by the time the sinus closed, or soon after.

As regards the *time* occupied by the treatment, I find that

the shortest period of confinement to bed was seven days, the longest, three weeks; the average stay in bed in all twelve cases was ten days. The shortest stay in hospital was ten days, the longest sixty days, the average twenty-seven days. Two cases were much slower in healing than the rest—one from the occurrence of the abscess just referred to, the other from unexplained causes. I think with proper care the ordinary case could be expected to get through in three weeks. I have had the opportunity of examining five of these patients one year after the operation, and they remain cured. Two have been seen six months, two others four months after operation, and are free from recurrence. Of the remaining three I have no information. I may state further that all were operated upon under ether except one. In this case cocaine was used, with the effect of rendering the operation absolutely painless.

The result of the treatment of these thirteen patients may be briefly stated as follows: One has died from mercurial poisoning. Twelve have recovered—ten after incision with suture, two after excision of the sac. The wounds, except in one case, have healed without pain or constitutional disturbance, and, on an average, in twenty-seven days, ten of which were spent in bed. Nine out of twelve patients are known to have had no recurrence at a period of from four to twelve months after the operation.

This list of cases adds one to the two deaths previously reported from this operation. A writer in the *Medical News* of May 3, 1884, collected from various sources 330 cases, of which two proved fatal from septicæmia or pyæmia. Bramann,[1] from v. Bergmann's clinic, has reported twenty cases without any deaths. This would make 363 cases with three deaths, a mortality percentage of .82. As to recurrence, I have no further information than that given of the 330 cases above referred to, where in five, or 1.5, it was noted.

The duration of treatment is variously given, and I do not think much stress can be laid on it, since no two surgeons estimate it in the same way. It is stated by Volkmann to be on

[1] "Berlin klin. Wochen.," April 6, 1885.

the average twelve days, by Juillard ten days, by Kuester and Rochelt fourteen days, by Lister seventeen days, Albert twenty-five days, Albers five to six weeks, English fifteen to forty-five.[1]

The possibility of recurrence is generally admitted, though alleged to be rare, and the cause is found in the failure of the two serous surfaces to unite fully after suture. Small cavities are left, which become the seat of reaccumulation. In order to obviate this, v. Bergmann has proposed the extirpation of the parietal layer, and carried it out in twenty cases, as mentioned above. The wounds healed without febrile movement on an average in ten to twelve days, and no recurrence has yet been seen.

From the experience of the two cases of hydrocele of the cord and one of hydrocele of the tunica vaginalis in which the parietal layer was cut away, and another case in which I have lately sacrificed this membrane in a cyst which complicated a varicocele, I can confirm the statement of Bramann that the method is exceedingly easy, is even more rapid than Volkmann's, since all the time spent in suturing the tunica to the skin is saved, and that the conditions for uncomplicated wound-healing are more favorable; and the extirpation of all the tunica which gives origin to the cysts seems to leave no chance for recurrence. The functions of the testicle and the cremaster muscle are in no way disturbed, and the cicatrix left is barely perceptible.

The technique of the operation needs but slight mention. The incision should reach from the top of the sac to the bottom of the scrotum, and I prefer to place its lower end behind the testicle in order that the drainage-tube may be out of the way. The tunica is best removed by stretching it on the fingers and cutting through and pushing back the loose connective tissue with blunt scissors. It is much easier than the extirpation of a hernial sac where the presence of a truss has made the layers adherent. The membrane is removed close up to the epididymis and testicle. It is important to be very painstaking with the ligatures, and to have the drain long enough to pass beyond

[1] These figures are from Bramann's article.

the testicle. In other respects one proceeds as in Volkmann's operation, but the suturing of the wound is simpler, as the tunica is absent.

The iodine injection has no deaths at its door, but a large percentage of recurrences has been noted. In 523 cases there have been forty-four recurrences, a percentage of 8.4, and acute suppuration has supervened in five instances, or .95 per cent.[1] The time of treatment at the clinic at Kiel is estimated at eight to nine days; in Billroth's clinic, about nine days; in the Charité Hospital at Berlin, two to seven weeks. I should think ten days an outside estimate for the cases I have treated in this way, most of which have been in private practice; but I agree with Bramann in assuming that this class of patients, as they have had no wounds, are apt to be dismissed from treatment many days before they are really able to resume their occupations, when there is still much swelling or tenderness present; and that, if we did not call them cured till the parts had been restored to a normal appearance, the duration of treatment with iodine injection would cover quite as long a period as that by antiseptic incision.

The carbolic-acid injection has as yet caused no fatal results. Of eighty-two cases reported by Weir and Abbé, there was suppuration in three cases, in one of which the sac sloughed. One recurrence is noted. The recent statement of Dr. Keyes,[2] that he has employed it in all classes of cases, to the number of more than fifty, without any accidents and with perfectly satisfactory results, is enough to warrant its general adoption. But I cannot help thinking that the method is too recent yet for us to get information as to the percentage of relapses. It is a striking fact that, of the thirteen cases I have met with, two had been treated unsuccessfully in this way. As it attempts a cure by the same process as that incited by iodine, an adhesive inflammation, I see no reason to believe that it will ever yield much better results. Fifty years ago the iodine method was reported from the Native Hospital of Calcutta (quoted by Curling) to have been employed in 2,393 cases with less than one per cent. of failures. But one German clinic has reported re-

[1] *Med. News*, May 3, 1884. [2] *Med. Record*, Feb. 20, 1886.

currence in 15.5 per cent. of the cases. The general impression is that carbolic acid is less painful than iodine, and that it is less irritating.

One fact bearing on the ability of any injection treatment has been demonstrated by the practice of antiseptic incision. That is, the presence of pathological conditions with which the injections could not reasonably be expected to cope successfully. In a total of 123 cases, collected by the writer in the *Medical News*, "cysts were found on the vaginal tunic, the testicle, or epididymis in forty-three, the testicle and epididymis were enlarged in twenty-three, the vaginal tunic was thickened in fifty-four, false membranes were present in twenty-six, and free or attached foreign bodies were met with in three." The two multiple cysts of the cord to which I have referred, one of which had twice resisted the injection of carbolic acid, go with these other figures to demonstrate to my mind that we must expect a certain percentage of failures.

The small percentage of failures after the antiseptic incision shows it to be, in my opinion, incontestably the *surest* way of curing any form of hydrocele; and if we add to this operation the extirpation of the tunica vaginalis, the method would be absolutely free from any recurrence. But it is certainly not without risk. Even with its small percentage of deaths—.82 per cent.—it makes a wound of considerable extent, which exposes the patient to all the accidents of wound-healing; it necessitates, if one acts with due caution, longer confinement to bed, and demands rigorous attention to, and every facility for, antiseptic treatment. In view of these considerations, I shall be disposed in the future to reserve the operation for cases in which the injection method has failed, or to perform it only upon patients who, with knowledge of its chances, prefer to take them. As to the relative merits of the carbolic-acid and iodine injections I have no opinion to express based on personal experience, but, from the experience of Weir, Keyes and others, I should feel warranted in adopting the carbolic acid, and in sticking to it till it is proved less satisfactory than it seems to be at present. But I believe that the possibility of failure or of an *early recurrence* should never be left out of consideration in recommending the injection of either agent, and

that we should be prepared with every antiseptic precaution to perform successfully the only truly radical operation—that of extirpation of the parietal tunica vaginalis.

DISCUSSION.

Dr. H. B. Sands said the operation, to which particular reference had been made, was one which he had found occasion to perform in only three instances, all of which had ended satisfactorily. But he thought the paper showed that a major operation should never be done when a minor operation would suffice. His own experience would go to show that iodine injections were not only safer than any other operation, but far more successful than would be inferred from Dr. Bull's paper. His experience might have been exceptional, but he could recall only very few failures in a large number of cases. He had supposed that failure after using iodine was not infrequently due to its faulty employment, using either too weak a fluid or one too small in quantity. He had usually employed the ordinary tincture of iodine, injecting from two to four drachms of it, and leaving it in the sac. He had never known symptoms of iodism to follow, and he had almost invariably found the practice to be followed by a cure. His own experience had been that the patient would recover within a week or ten days. He could recall six cases in which he had operated within the last eight or nine months, all in private practice, and all these patients had gone out of the house in the course of a week, except one who remained indoors much longer than was necessary for his health. He did not think iodine injections were attended with any risk to life, or with much danger of recurrence of the hydrocele. Of course, as Dr. Bull had said, the incision sometimes revealed pathological conditions with which injections could not be expected to cope. But the best answer to the question would be found in the result of a large experience, and his own experience was very strongly in favor of iodine injections. He could see no excuse for subjecting any patient suffering with ordinary hydrocele to the antiseptic operation. As the writer had said, it was necessary to observe strict antiseptic precautions, which might be carried out in large cities and in hospital practice, but to recommend such a method for general use would be very dangerous, and he was very strongly opposed to it, because it was only when the iodine treatment had failed, and the pathological condition was such as could not be removed by the iodine treatment, that it was justifiable. He had had only a limited experience in the use of carbolic acid, but he had twice seen suppuration follow its use, which he had not seen after the use of iodine, and

he thought injection of the sac with iodine was attended with the least possible risk. He had never seen constitutional disturbance which had given him any alarm. He believed that the use of iodine, or perhaps carbolic acid, which might be less painful, was better than incision, which should be reserved for cases in which the ordinary treatment had failed.

Dr. C. K. Briddon had performed Volkmann's operation a number of times, and his experience with reference to cure did not coincide with that of the author of the paper; certainly the period required to effect a cure was much longer. He though one difficulty was in applying an antiseptic dressing to the scrotum, from it being so movable. He had had quite a large experience with the use of iodine injections, and the results coincided with Dr. Sands'. He had treated a large number of cases where the patients had not been confined to bed at all. The latter cases had occurred in dispensary practice a good many years ago, and he remembered only one patient whom he had visited after his hydrocele had been injected at the dispensary; that was an old man in whom there was a double hydrocele, and he had made the injection on both sides at one sitting. There was quite sharp reaction, but no suppuration occurred. In all the other cases the patients visited the dispensary within four or five days, which he recollected was the average period of time they were kept from their work. His method was first to empty the sac and then inject two or three drachms of tincture of iodine, to which was added a piece of iodide of potassium as large as a pea, to prevent the precipitation of iodine in the scrotum. He did not remember a single recurrence; if recurrence took place, the patients did not return to him. He had not used carbolic acid, because he had been so well satisfied with iodine. The only disaster he had had was in a case where he had tapped without injecting iodine, and sloughing of the scrotum too place.

Dr. R. F. Weir said that in 1882 he had presented to the society a paper on the subject of carbolic acid injections for hydrocele, as suggested by Levis, of Philadelphia, and he had then reported that he had performed Volkmann's operation twenty-seven times, and had gladly abandoned it in favor of the newer method of treatment, which was not only superior to Volkmann's operation, but also to the iodine treatment, after which he had seen occasional relapses and great pain following immediately upon the use of iodine, together with sufficient inflammatory action to keep the patient in bed several days, and to give rise to a great deal of suffering. Besides, in his army experience he had seen one case of death follow injection of hydrocele with iodine,

but this had occurred in a patient who was enfeebled by a recent fever, and in whom the inflammation involved the cord and subperitoneal tissues. He had now used carbolic acid injections over sixty times, and in only two cases had he regretted their use. Occasionally relapses had occurred, not in a large proportion, however, as he could recall only four or five instances, and in those the patients were cured by a repetition of the same treatment. In three of these the injection was repeated too soon, as subsequent experience showed that a longer delay would probably have resulted in a cure. In one instance of the two just alluded to there was quite extensive suppuration following the use of carbolic acid, and in another suppuration was threatened. In the one in which suppuration occurred a lesson was derived which was of importance to place before the society and ask attention to. He had been, up to this time, in the habit of injecting various quantities —from half a drachm to drachm and a half—of carbolic acid after emptying the sac. In this case, one of quite a large hydrocele, the iodine treatment had been unsuccessful, and the other side of the scrotum had been treated successfully by incision after the old method. He injected a drachm and a half of carbolic acid, which was followed by the usual absence of pain, but with recurrence of swelling after a few days, which did not subside, but went on to suppuration, and on opening the abscess, shreds of membrane were discharged, and finally large masses; in other words, gangrene of nearly the entire tunica vaginalis was produced. Since then he had rarely injected more than half a drachm at a time. Not that he was dissatisfied with the carbolic-acid treatment, but, led by a desire of testing the operation under cocaine, he had late performed Volkmann's operation five times with the new anæsthetic with satisfactory results, one of which was done on a man at the college clinic. The operation was painless, an antiseptic dressing was applied, a well-padded compress and a double figure-of-eight bandage, and the man was allowed to go home. Two days afterward he appeared at the hospital for inspection of the dressing, which was still complete. It was an ambulant case throughout, and progressed favorably from the outset, which illustrated that it was possible to keep an antiseptic dressing upon the scrotum when thoroughly applied.

The objection to Volkmann's operation, and to the still more thorough one of Bergmann, was a just one, and its severity was fully appreciated by Koenig, who had stated that if he had a hydrocele he should prefer the injection process rather than undergo such an heroic operation for a small ailment. The speaker still felt that the painlessness of carbolic acid injections and comparatively slight reaction, as well as the

fair amount of certainty of cure, entitled them to the first place in the treatment of this affection.

Dr. Sands remarked that Dr. Weir had confessed to eight to ten per cent. of failures or recurrences. He had not seen any such percentage of failures or recurrences after the iodine treatment.

Dr. Weir referred to Osborn's recent monograph, in which he gave fifty-four cases with eighteen failures with the iodine treatment, which was a very large percentage.

Dr. George A. Peters said his experience had been chiefly in the use of injections of iodine, and he had been very well satisfied with them—so well satisfied that he had not been tempted to perform Volkmann's operation. He injected the pure tincture, and the quantity was two drachms. He thought one reason why occasional suppuration occurred was carelessness in its use, some of the tincture being allowed to get into the cellular tissue. As to duration, he thought that a week or ten days would cover the treatment. In his experience the number of recurrences had been very small.

Dr. L. A. Stimson said his personal experience with Volkmann's operation had been limited to three cases. In the last one, that of a young man, he had made an incision not more than an inch and a half in length, stitched the edges of the parietal tunica to the skin, and then washed the cavity of the sac out with pure carbolic acid. He had done this with the expectation of so modifying the apposed surfaces that union would take place promptly and completely, and in this instance the result had justified the hope, as the patient got well without discharge from the wound after the first twenty-four hours. The cure was complete. This was the only case in which he had applied carbolic acid in this manner. As to the carbolic acid treatment, he had seen one case of suppuration after injection of a solution of carbolic acid in glycerine. He had seen some cases of recurrence after the use of the method; in one of them spontaneous cure took place afterward. In two cases he had tried another method, namely, injections of chloride of zinc. One was in a lad, eighteen years of age, in which, without drawing off the liquid, he had injected half a drachm of five per cent. solution of chloride of zinc. It caused no pain at the time, but during the afternoon and evening and the following day the pain was considerable; on the fourth day he drew off four ounces of liquid, which was turbid and contained many leucocytes, and the case then went on to recovery without further incident. In another case a weaker solution had failed, but he thought the method was worthy of further trial.

Dr. Lange mentioned one rare occurrence which he had met with in operating according to Volkmann's method—the presence of two or three long hairs taking their origin from the tunica vaginalis of the testicle. He excised the hairs, but had not made a microscopic examination of the tissue from which they took their origin. Recovery took place without disturbance. He had not seen disagreeable symptoms after Volkmann's operation, which he had performed in a number of cases, but he must say that, as a rule, in cases where the tunica vaginalis was thin and the hydrocele not of long standing, he treated them by the injection of iodine. He had seen recurrence exceptionally after repeated injections. Probably for a small percentage of cases the radical operation would always remain necessary—for instance, for those where the tunica vaginalis was very much thickened and cases of hæmatocele where thick fibrinous false membranes existed. He did not regard the operation as dangerous if the necessary precautions were taken.

Dr. T. M. Markoe was convinced that the success of the iodine treatment depended very much upon the manner in which it was carried out. He had not used the simple tincture, for the reason that the iodine would be precipitated by the serous fluid, and be liable to be deposited in a single spot, where it was more likely to produce irritation, if irritation was produced at all. He had, therefore, for a great many years used the strong Lugol's solution. This in his hands had been very efficacious. Although he had performed Volkmann's operation a certain number of times in hospital practice, he had in private practice still adhered to the iodine treatment.

Dr. T. McBurney had met with quite a number of cases in which the patients had reported that they had received injections of iodine, and, in some instances, two or three times. He had, however, been struck with the ease with which cure was effected in even these cases by repeating the process. He had thought that the recurrence was due to one of two errors—either in not empting the sac completely, or in using too little iodine. The operation was so simple, and had been so long employed, that he thought one or both of these errors were very frequently made. His own experience had led him to believe that, if the fluid was evacuated entirely, and the injection made very fully, using half an ounce instead of a drachm, as was frequently used, of iodine, the success was very great.